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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.          | CONFIRMATION NO. |
|---|-------------|----------------------|------------------------------|------------------|
| 09/901,837  | 07/10/2001  | Shubneesh Batra      | MCRO:199--3/FLE<br>95-0057.0 | 9030             |
| 7590 05/27/2004   |             |                      | EXAMINER                     |                  |
| Michael G. Fletcher<br>Fletcher, Yoder & Van Someren<br>P.O. Box 692289<br>Houston, TX 77269-2289 |             |                      | EVERHART, CARIDAD            |                  |
|   |             |                      | ART UNIT                     | PAPER NUMBER     |
|   |             |                      | 2825                         |                  |

DATE MAILED: 05/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/901,837

Applicant(s)

BATRA ET AL.

Examiner

Caridad M. Everhart

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,30-38,40-44,47-56,58,60-62,64 and 65 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 40-44,47-56 and 58 is/are allowed.
- 6) ☒ Claim(s) 1,30-38, ~~40-44, 47-56, 58~~, 60-62, 64 and 65 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                    | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____  |

Applicant's arguments with respect to claims 1,30-38, 60-62, 64, and 65 have been considered but are moot in view of the new ground(s) of rejection.

Applicant has amended to include the limitations "only during about the last 30% of the deposition of the conductor layer" and "wherein the impurity does not form an alloy with the conductive material". Claim 1 does not require the impurity be deposited while the conductor is being formed, and neither does claim 30 nor claim 60.

### ***Claim Objections***

Claim 37 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 30 requires the steps to be performed in the recited order. Claim 30, by requiring step c to be performed during step b seems to be inconsistent with the requirement that the steps of claim 30 be performed in order.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 30-32 are rejected under 35 U.S.C. 102(e) as being anticipated by Kawano, et al. ("Kawano")(US 6,066,558).

Kawano discloses forming on a semiconductor substrate having a contact, depositing a conductor layer(col. 6, lines 59-67), forming an impurity layer in the contact hole after about the last 30% of the conductor has been deposited(col. 7, lines 50-60), said impurity lowering the melting point of the conductor, and reflowing the conductor at a temperature to cause reflow(col. 8, lines 25-35 and col. 9, lines 22-40). The steps are performed in order(Fig. 2D-H). The temperature is within the recited range. The impurity is Ti(Fig. 2F). The substrate taught by Kawano includes layers formed on the semiconductor substrate, which is understood by one of ordinary skill in the art to be a semiconductor substrate, and applicant also includes in applicant's specification to be understood as a semiconductor substrate a wafer with other layers formed on the wafer.

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 33,34,35,36-38,60-62, 64, and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano, et al .

Kawano is silent with respect to migration out of the contact hole and about the degree of lowering of the melting point and of the impurity not forming an alloy.

With respect to the formation of an alloy, because the reflow is at a low temperature, it would have been obvious to one of ordinary skill in the art at the time of

the invention that the impurity would not have formed an alloy because of the low temperature of the reflow.

With respect to the degree of lowering of the melting point, because Kawano teaches Ti, it would have been obvious to one of ordinary skill in the art to expect the recited degree of lowering of the melting point, because Ti is one of the impurities disclosed by applicant. With respect to migration out of the contact hole, this is within the ordinary skill in the art to choose the impurity with the desired properties, as Kawano teaches that other impurities may be used (col. 8, lines 25-38).

***Allowable Subject Matter***

Claims 40-44,47-56,58 are allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caridad M. Everhart whose telephone number is 571-272-1892. The examiner can normally be reached on Monday through Fridays 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C. Everhart  
5-24-2004

  
CARIDAD EVERHART  
PRIMARY EXAMINER